

CLAIMS

1. A method of making a modified pigment comprising reacting a pigment having attached a first chemical group with a second chemical group to form said pigment having attached a third chemical group, wherein the second chemical group reacts with the first chemical group to form the third chemical group, and said first chemical group comprises at least one electrophile and said second chemical group comprises at least one nucleophile, or vice versa.

2. The method of claim 1, wherein said pigment having attached said first chemical group is prepared by reacting a diazonium salt having a first chemical group with at least one type of pigment to form said pigment having attached a group comprising the first chemical group.

3. The method of claim 1, wherein the first chemical group, the second chemical group, and the third chemical group each comprises at least one organic group.

4. The method of claim 3, wherein the organic group is selected from the group consisting: carboxylic acids or esters, acid chlorides, sulfonyl chlorides, acyl azides, isocyanates, ketones, aldehydes, anhydrides, amides, imides, imines,  $\alpha,\beta$ -unsaturated ketones and aldehydes, alkyl halides, epoxides, alkyl sulfonates and sulfates, amines, hydrazines, alcohols, thiols, hydrazides, oximes, carbanions, aromatic compounds, and salts and derivatives thereof.

5. The method of claim 1, wherein the first chemical group comprises an alkylsulfate group, a carboxylic acid group, or a salt of a carboxylic acid group.

6. The method of claim 1, wherein the first chemical group comprises a (2-sulfatoethyl)-sulphone group.

7. The method of claim 6, wherein the first chemical group is phenyl-(2-sulfatoethyl)-sulphone.

8. The method of claim 1, wherein said second chemical group comprises a polymer.

9. The method of claim 8, wherein the polymer is selected from the group consisting: a polyamine, a polyalkylene oxide, a polyol, a polyacrylate, and salts and derivatives thereof.

10. The method of claim 9, wherein the polymer is a polyamine.
11. The method of claim 10, wherein the polymer is polyethyleneimine.
12. The method of claim 1, wherein said pigment is carbon black.
13. The method of claim 1, wherein said pigment comprises a blue pigment
- 5 black pigment, brown pigment, cyan pigment, green pigment, white pigment, violet pigment, magenta pigment, red pigment, yellow pigment, or mixtures thereof.
14. The method of claim 1, further comprising reacting said third chemical group attached onto said pigment with at least one additional second chemical group, wherein the additional second chemical group comprises at least one electrophile and the
- 10 third chemical group comprises at least one nucleophile, or vice versa.
15. The method of claim 14, wherein the additional second chemical group comprises a carboxylic acid group, a acid chloride group, or an anhydride group.
16. The method of claim 14, wherein the additional second chemical group comprises a polymer.
- 15 17. The method of claim 16, wherein the polymer is selected from the group consisting: a polyamine, a polyol, a polyalkylene glycol, a polyacrylate, a protein, a polyamino acid, and salts and derivatives thereof.
18. The method of claim 16, wherein the polymer is a polyacrylate or methacrylate.
- 20 19. The method of claim 18, wherein the polyacrylate is polyacrylic acid.
20. The method of claim 14, wherein the additional second chemical group is succinic anhydride.
21. A modified pigment comprising a pigment having attached at least one organic group, wherein said organic group comprises: the reaction product of at least one
- 25 (2-sulfatoethyl)-sulphone group and at least one nucleophilic polymer
22. The modified pigment of claim 21, wherein the organic group is directly attached to the pigment.
23. The modified pigment of claim 21, wherein the (2-sulfatoethyl)-sulphone group is phenyl-(2-sulfatoethyl)-sulphone.
- 30 24. The modified pigment of claim 21, wherein said nucleophilic polymer is a poly(vinyl alcohol), polyalkylene glycol, polyamine, or combinations thereof.

25. The modified pigment of claim 21, wherein the nucleophilic polymer is polyethyleneimine or derivatives or salts thereof.

26. A modified pigment comprising a pigment having attached at least one organic group, wherein said organic group comprises: the reaction product of at least one  
5 benzoic acid group and at least one nucleophilic polymer.

27. The modified pigment of claim 26, wherein the benzoic acid group is directly attached to the pigment.

28. The modified pigment of claim 26, wherein said nucleophile polymer is a poly(vinyl alcohol), polyalkylene glycol, polyamine, or combinations thereof.

10 29. The modified pigment of claim 26, wherein the nucleophilic polymer is polyethyleneimine or derivatives or salts thereof.

30. A modified pigment comprising a pigment having attached at least one organic group, wherein said organic group comprises: the reaction product of at least one electrophile and a nucleophilic polymer; and an acylating agent.

15 31. The modified pigment of claim 30, wherein the nucleophilic polymer is a poly(vinyl alcohol), a polyalkylene oxide, a polyamine, or combinations thereof.

32. The modified pigment of claim 30, wherein the nucleophilic polymer is polyethyleneimine or derivatives or salts thereof.

20 33. The modified pigment of claim 30, wherein the acylating agent is succinic anhydride or polyacrylic acid.

34. An ink composition comprising a liquid vehicle and a modified pigment, wherein the modified pigment comprises a pigment having attached at least one organic group, wherein said organic group comprises: the reaction product of a pigment having attached at least one (2-sulfatoethyl)-sulphone group and at least one nucleophilic  
25 polymer

35. The ink composition of claim 34, wherein the ink composition is an inkjet ink composition.

36. An ink composition comprising a liquid vehicle and a modified pigment, wherein the modified pigment comprises a pigment having attached at least one organic  
30 group, wherein said organic group comprises: the reaction product of a pigment having attached at least one benzoic acid group and at least one nucleophilic polymer.

37. The ink composition of claim 36, wherein the ink composition is an inkjet ink composition.

38. An ink composition comprising a liquid vehicle and a modified pigment, wherein the modified pigment comprises a pigment having attached at least one organic group, wherein said organic group comprises: the reaction product of a pigment having  
5 attached at least one electrophile and a nucleophilic polymer; and an acylating agent.

39. The ink composition of claim 38, wherein the ink composition is an inkjet ink composition.

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